

## Consultation response

March 2021

This is a response to the Law Commissions' consultation on Automated Vehicles on behalf of the *Driverless Futures*?<sup>1</sup> team. Our project, funded by the Economic and Social Research Council, is a three-year (Jan 2019 – Dec 2021) social science investigation of the governance options for self-driving cars. The project has conducted more than 50 in-depth expert interviews and has been involved with multiple public engagement initiatives, including the Sciencewise CAV acceptability dialogue.<sup>2</sup>

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## Introduction

The Law Commissions' three consultations represent one of the first serious policy attempts to engage with the short-term uncertainties and opportunities of AVs. The consultations and associated reports clarify some issues that are often intentionally or unintentionally blurred.

Taken together the Law Commissions' three consultations highlight the importance within existing traffic law of individual vehicles and drivers on the road. We have some concerns that the consultations could be seen as seeking to enable the introduction of AVs onto UK roads without full consideration of the range of uncertain, long-term issues and opportunities that might be raised. We would advise that deploying automated driving technologies should not be seen as a goal in itself. The Law Commissions' commitment to two pathways – either private vehicles with a user-in-charge, or mobility service vehicles – treats as predetermined both the advent and the form of the technology, which could limit the scope of regulation and limit the opportunities for beneficial technological systems and business models.

During the twentieth century the car forced pedestrians off the roads. In the early stages of the contest pedestrians faced increased risks and in the later stages regulation and town planning pushed them off the roads to enable the wider penetration of automobiles while claiming such

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<sup>1</sup> <https://driverless-futures.com/>

<sup>2</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/951094/cav-public-acceptability-dialogue-engagement.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/951094/cav-public-acceptability-dialogue-engagement.pdf)

measures were for pedestrians' own good. The first two decades of the twenty first century has seen some rebalancing of priorities in the UK, through the introduction of shared space streets and a sharp increase in informal pedestrian crossings. Despite early representations of urban automated vehicles successfully sharing spaces with pedestrians, the technological reality is that this mixing looks all-but-impossible. There will be difficult choices to be made about priority and the allocation of street space. Without careful thought, we risk a reversion to a vehicle-dominated streetscape, justified on the grounds of safety, unless enabling the technology is made subservient to the delivery of society's wider mobility objectives.

References to paragraphs below are to the "Summary of Consultation Paper 3 – A regulatory framework for automated vehicles".

### What counts as 'self-driving' and who should decide? (Consultation questions 1, 3, 13 and 14)

There is substantial evidence from human factors research that in-motion transitions to human control are inherently unsafe. A legislative framework that licenses such systems would put enormous pressure on a regulator if that regulator has the burden of proof.

An ADS should be assessed in the context of a specific operational design domain (ODD), which might be a geographic area or might depend upon weather or traffic conditions. An ADS should not be treated as an autonomous entity, equivalent to a human drivers. Their operations are conditional and depend on various attachments to people, infrastructures and other digital systems.<sup>3</sup> A licensing regime must anticipate how an ADS deals with meeting or crossing the edge of its ODD. Any license needs to have considered the whole of the intended operations of the ADS, rather than licensing individual elements separately.

As rightly pointed out by the Law Commissions' report, the current legal framework for defining a vehicle as capable of self-driving is inadequate. We welcome the suggestion of establishing a new legislative framework for classifying self-driving vehicles. Members of the public and a broad range of experts should be involved in developing this framework.

We would support the principle of ministerial responsibility, rather than industry self-regulation. However, this leaves open the question of when we can say a line has been crossed between development and deployment of systems. In the US, Waymo have removed drivers from some of their vehicles – a de facto deployment – with little regulatory oversight. Such decisions, involving potentially lethal safety-critical systems, should not be left to the industry. Existing hazards from road traffic should not be used to excuse the possibility of new risks. We support the proposals in questions 3, 13 and 14.

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<sup>3</sup> Tennant and Stilgoe, forthcoming, The attachments of 'autonomous' vehicles, available on request

## How safe is safe enough? (Consultation Question 4)

Regulators should be wary of assuming a comparison for risk acceptability. The question ‘how safe is safe enough?’ cannot be answered by science or engineering. It is a matter for society. There is substantial uncertainty about public views on safety. Some early research<sup>4</sup> seems to support the view that a sizeable proportion of the public wants self-driving cars to be at least two orders of magnitude safer than conventional cars, akin to rail and air travel, which is what we would predict from risk acceptability in forms of transport involving novelty and a lack of control. People expect higher safety when they are putting their lives in the hands of others, and this may be further complicated with the addition of (possibly unaccountable) automation. However, the potential risks to bystanders might lower the acceptable risk further. Comparable data on average performance will be impossible to gather before deployment.<sup>5</sup> And average measures of overall safety will do little to reassure the family of anyone killed by a robot. The question ‘how safe is safe enough’ is linked to further questions: ‘safe enough for what?’ and ‘safe enough for whom?’ Perceptions will be framed by questions of fairness and benefits.<sup>6</sup> A transition to AVs will see winners and losers. Safety will be a crucial part of the social contract for automation of mobility. A sense of justice and injustice will frame public risk perceptions. Regulators might have targets for safety, but members of the public may legitimately disagree especially if the beneficiaries of safety improvements are predominantly the users of ADS rather than shared by all road users. Finally, safety must be assessed in context. AVs operate in limited ODDs: comparing to data for human driving in wider environments is unlikely to be appropriate. AV safety standards should be defined for the ODD.

The Sciencewise public dialogue exercise on CAVs had plenty of discussion on safety, which encompassed personal security, particularly for women in vehicles with no driver, and cybersecurity. The conditions for acceptability of CAVs drawn up by the groups are worth noting:

- If the technology is proven to be safe and secure
- If the benefits of the technology are widely available
- If the technology is good for society and jobs
- If we’re in control of our transport
- If there is clear guidance on accountability
- If new regulatory bodies are created<sup>7</sup>

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<sup>4</sup> Liu, P., Yang, R., & Xu, Z. (2019). How safe is safe enough for self-driving vehicles?. *Risk analysis*, 39(2), 315-325.

<sup>5</sup> Kalra, N., & Paddock, S. M. (2016). Driving to safety: How many miles of driving would it take to demonstrate autonomous vehicle reliability?. *Transportation Research Part A: Policy and Practice*, 94, 182-193.

<sup>6</sup> Stilgoe, J (forthcoming) How can we know a self-driving car is safe? (submitted to Ethics and information technology)

<sup>7</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/951094/cav-public-acceptability-dialogue-engagement.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/951094/cav-public-acceptability-dialogue-engagement.pdf)

## Access and equality (Consultation Questions 6 and 42)

The existing mobility system is unfair to many groups in ways that go beyond the discrimination identified by public sector equality duties. The marginalisation of many segments of the public has evolved over time within the present transport system. A digitally organised system will not naturally deliver improvements in accessibility, affordability and sustainability. The challenge for AV regulators is to enable testing to progress the technology without committing to technologies or business models that are likely to create or exacerbate inequalities. AV regulators will need to impose these wider mobility system goals and avoid prioritising the introduction of ADS technology as the goal itself.

Reluctance to regulate early risks technological lock-in. 'Technical feasibility' is likely to be defined by economic feasibility, favouring existing systems already established in the trial phase, instead of insisting that, over the long term, the original broader goals for the new mobility system are prioritized. Continuing consultation, engagement and re-evaluation will be vital as some systems scale, others fail and technology changes.

Accessibility and equality considerations should not just focus on potential passengers. It will be important to represent the views of cyclists, pedestrians and children in decisionmaking. Subject to those considerations, we agree with the proposals.

## Scenarios and driving tests (Consultation Question 8)

Scenarios such as those being developed by the PEGASUS project could be an important part of any licensing regime. Scenarios will be a more indicator for quality assurance than number of miles driven. However, experts concede that no database can be exhaustive. The selection of scenarios will therefore be crucial and should be an inclusive process. There is a risk to both safety and credibility if companies develop their own simulations and scenarios or if companies are perceived as 'teaching to the test' is scenarios are too predictable. It is important to specify which ODD in which the self-driving vehicle can operate. Regulators should also consider going beyond performance-driven criteria to scrutinise how an AV works, rather than just how well it passes a test (see section on data below). There is a strong argument for prescriptive regulation rather than performance-based safety cases in some areas.<sup>8</sup>

## ADS approval (Consultation Questions 10 and 11)

We disagree with the proposal in question 10. We fail to see the wisdom in two different approval systems. Such a structure could create inconsistencies. We see little potential for competitive advantage and a risk if the UK is not fully committed to a UNECE process. We urge the Commissions to pursue responsible, not deregulatory innovation. The Sciencewise public

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<sup>8</sup> Leveson, P. N. (2011) White Paper on the Use of Safety Cases in Certification and Regulation.  
<https://dspace.mit.edu/handle/1721.1/102833>

engagement groups forcefully demanded independent oversight of the technology. Whilst developers express concern that early regulation would stunt the growth of the technology, oversight is essential to innovate responsibly and avoid premature lock-in.

The proposals suggested here need much more thought, in consultation with a wide group of stakeholders. An ADS should not just be seen as a suite of gadgets in or on a vehicle. An ADS will depend on its environment, its surroundings and its connectivity. Approving an ADS in isolation from its ODD could be incoherent. We are concerned that these proposals appear to follow a narrative of autonomy that most AV developers are now admitting is problematic.<sup>9</sup>

### Testing, deployment and metrics (Consultation Questions 16, 18 and 22)

We agree that the regulator that classifies vehicles as self-driving should be allowed to gather further data on safety performance of the vehicles in real-world conditions. However, we suggest that these vehicles should only be granted a provisional license in the first instance. Testing should not be allowed to become a de facto deployment. Safety cases to justify testing should not become safety assurance regimes or licences to scale up. The gathered data should be shared with the regulator. California's disengagement reports provide an early attempt to request data, but have revealed very little of any value. Future tests must demand more from developers in exchange for the use of public roads.

Once the vehicles have a permanent license, the data should be brokered by a third-party data broker (see response to Q 55, 56 & 58) which can generate reports for the regulator.

Questions 18 and 22 require performance measurement of the ADS. It is essential that the final say on measured performance resides with an independent body, both in terms of the measurements required from the ADSE and the opportunity and capability to independently audit measurements submitted by the ADSE. Regulatory capture is a real risk here, and the practical challenges of establishing and maintaining competent independent capability are no reason to go down the route of self-regulation. Leading metrics (including but not limited to near misses) will be a more important indicator of safety than actual damage, but such metrics should not be cherry-picked by developers. We agree that maps will need to be regulated as part of an ADS, but some developers are currently not explicit about their reliance upon mapping. Developers will need to be forced to explain their dependence upon the connections with the outside world that their vehicles depend on.

### Collisions and blame (Consultation Question 25)

We agree with the need for a specialist unit to analyse data and conduct investigations. The NTSB's role in major ADS crashes in the US when other bodies were incapable of asking the right questions shows the value of such a body. The independence of this unit should be

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<sup>9</sup> Tennant and Stilgoe, forthcoming, The attachments of 'autonomous' vehicles (available on request)

guarded closely. Given the potential of AVs to gather important data on near misses, this unit should not just limit itself to collisions in its demands for incident reporting.

We agree with an emphasis on learning rather than blame, but this recommendation should not be allowed to creep too far. With respect to a no-blame safety culture, the Law Commissions have compared this to the regime operating in air safety. That regime has emerged over a long period during which public confidence has been established by achieved safety improvements in a mature technology. Such a philosophy does not seem appropriate for an immature technology and a market populated by competitors who see themselves competing in a race to achieve scale. If the wider system is seen as avoiding blame, it will lack public credibility. Individuals and organisation may need to seek redress after a collision. We should not presume that AVs will make current patterns of liability redundant. The protection of consumers in terms of product liability and vulnerable road users may become more important than ever. The NTSB's motto that "anybody's accident is everybody's accident" is laudable, but a crash investigator will only be one part of the legal system. Other parts of the system should be asking where responsibility lies, rather than helping irresponsible actors escape blame. No-blame safety cultures are encouraged in highly-regulated, high-reliability systems where technologies are established and systems are looking to eradicate egregious mistakes. Where rules are sparse, as with AVs, such an approach could be seen as an endorsement of recklessness. A no-blame culture when prototype technologies are being tested in public could be seen as organised irresponsibility.<sup>10</sup>

## Rules of the road (Consultation Questions 26 and 27)

We agree that a forum should be established. The application of rules of the road to AVs, and the possible changes to those rules that may need to follow could be extremely contentious.<sup>11</sup> The forum should consider, among other issues: the prioritisation of vulnerable road users' protection; rules governing the behaviour of AVs in situations where human drivers currently use judgement, e.g. unprotected turns, roundabouts, merging, over-taking; whether and how highway authorities should invest in infrastructure specifically to accommodate AVs.

Most forums currently discussing new road rules, in particular standards setting committees, are dominated by AV developers. This process is likely to prioritise the introduction of the technology as a goal rather than broader objectives for future mobility systems. There is a need for a diverse forum - including independent views on road safety, transport planning and engineering, allocation of roadspace and urban planning. Participants in the Sciencewise public dialogue on CAV acceptability expressed a strong desire for more voices to be involved in decision making

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<sup>10</sup> See Stilgoe, J (2020) Who's driving innovation? New technologies and the collaborative state (Palgrave) (the phrase is from sociologist Ulrich Beck)

<sup>11</sup> Tennant et al, forthcoming, Concrete, code and culture: Self-driving cars and the rules of the road, available on request

The forum should commission and act upon public engagement and social research. Successful models would include the Human Fertilisation and Embryology Authority, which governs new reproductive technologies, and the Human Genetics Commission. Our project, and bodies such as Sciencewise, the Ada Lovelace institute and the Centre for Data Ethics and Innovation can advise.

## Users in charge (Consultation Question 28)

The introduction of the user-in-charge concept is a welcome step towards defining accountability for the behaviour of individual ADS on the road. However, just as claims that 94% of accidents can be attributed to human error have perpetuated the tendency for the operator to be blamed when systemic failings also need to be recognised, so too the user-in-charge's responsibilities should not be used to reduce those of the ADSE. Systemic failings that place users-in-charge, or indeed drivers, in situations where errors are more likely must attribute responsibility to the system as well as its operators and must lead to system-level learning. And questions of handovers would remain a problem.

Limiting systems to direct sight could encourage development of AVs that are privately owned and used, a model that raises huge policy concerns when scaled up, and foreclose some more interesting models involving remote control. We would urge more research and thinking on this point.

## Data-sharing (Consultation Questions 55, 56 and 58)

Regulators will play a vital role in the curation and sharing of data, some of which will be safety-critical. Given the quantities of data easily generated by AVs, members of the public will ask legitimate questions if this is kept hidden at a cost to public safety. We agree it is essential AVs should collect data to allow for accident investigations as well as to establish transparency and accountability. The vehicles should have an equivalent of a Flight Data Recorder – an ethical black box.<sup>12</sup> This will allow for transparency of the system, which will ensure that the AV's decisions are accessible to stakeholders.

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<sup>12</sup> Winfield A.F.T., Jirotko M. (2017) The Case for an Ethical Black Box. In: Gao Y., Fallah S., Jin Y., Lekakou C. (eds) Towards Autonomous Robotic Systems. TAROS 2017. Lecture Notes in Computer Science, vol 10454. Springer, Cham. [https://doi.org/10.1007/978-3-319-64107-2\\_21](https://doi.org/10.1007/978-3-319-64107-2_21)